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# Parental support and influencing factors for school-age children's healthy movement behavior: a cross-sectional study

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# ABSTRACT

**Introduction:** Optimizing healthy lifestyles in children requires parental support for healthy movement behaviors. This study analyzed factors influencing parental support for school-age children's movement activities.

**Methods:** This study employed an analytic descriptive design with a cross-sectional approach, involving a sample of 355 mothers with school-age children. The independent variables included family, child, and environmental factors, whereas the dependent variable was parental support for healthy movement behaviors, as assessed through a questionnaire. Data analysis was performed using binary logistic regression with backward elimination.

**Results:** The factors that significantly influenced parental support for their children's engagement in light physical activities included the children's own level of participation in such activities (OR=2.52, 95% CI=0.76-6.67). Factors affecting support for moderate to vigorous activities were maternal exercise habits (OR=3.37; 95% CI=1.18-9.65), children's sports habits (OR=5.18; 95% CI=1.64-16.26), and the presence of personal gadgets (OR=0.45, 95% CI=0.23-0.86). Parental support for preventing sedentary behaviors was influenced by parental knowledge (OR=2.33; 95% CI=1.34-4.05), mother's sleep duration (OR=2.46; 95% CI=1.27-4.75), and gadgets (OR=0.55; 95% CI=0.31-0.95). Factors affecting support for adequate sleep included children's light activities (OR=3.42; 95% CI=1.27-9.23) and their ownership of personal gadgets (OR=0.44; 95% CI=0.24-0.79)

**Conclusions:** Parental support is influenced by the knowledge and physical activity habits of both mother and child, as well as gadget use and maternal sleep patterns. Pediatric nurses can enhance this support through health education focused on promoting healthy movement behaviors within families.

Keywords: healty lifestyle, healthy movement behaviors, parental support, school-age children

# Introduction

The digital era and the COVID-19 pandemic have brought about significant changes in children and adolescents. For instance, many of them have sedentary lifestyles owing to technological advancements that have made all activities simple, instant, and practical. The COVID-19 pandemic has also contributed to alterations in the movement patterns of children. Consequently, school-aged children no longer have the opportunity to engage in physical activity at school, play outside the home, exercise, or participate in school activities (Bates *et al.*, <u>2020</u>; Guan *et al.*, <u>2020</u>). In the post-pandemic period, this circumstance also affected



the everyday activity patterns of school-aged children. A decrease in physical activity, an increase in sedentary behavior, and insufficient sleep length are current issues among school-aged children (Bates *et al.*, <u>2020</u>; Margaritis *et al.*, <u>2020</u>)

The World Health Organization (WHO) has issued guidelines for physical activity, sedentary behavior, and adequate sleep duration in children (WHO, 2019). According to these guidelines, children aged 5 to 17 years should engage in at least 60 minutes of physical activity per day, spend no more than two hours in front of a screen, and sleep for 9 to 11 hours per night (Guan et al., 2020). In reality, school-age children have a difficult time implementing it, and their physical activity has decreased drastically compared to before the pandemic (López-Bueno et al., 2021). The study stated that the average physical activity of children is currently 1.29 hours per week, with an increase in screen time of almost 5 hours per day (Pietrobelli et al., 2020). If people closest to the child are unable to regulate the child's activities properly, it is risky to cause adverse effects on children's health. In recent years, the prevalence of childhood obesity has dramatically increased (Ministry of Health, 2018).

In Indonesia, people hold false beliefs regarding the nutritional status of children; many parents believe that obese children are healthy (Yuarnistira et al., 2019); parents tend to believe that physical activity and sedentary behavior are unimportant behaviors (Ulfiana, Rachmawati and Fadhilah, 2019), According to the 2018 Basic Health Research data in Indonesia, 20% of schoolage children are overweight and obese (Ministry of Health, 2018). In addition, cases of type 2 diabetes mellitus in children have increased 70 times in 2023 due to changes in lifestyle, including nutritional problems and physical activity (Ministry of Health, 2023); however, if the pattern of parental regulation of children's movement activities is not appropriate, it can lead to long-term health problems in children. If parental support for adequate movement behavior in school-aged children is not ideal, it becomes challenging to reverse the decline in physical activity, increase sedentary behavior, and reduce sleep duration; this situation will increase the risk of obesity in children. This study focused on factors based on the framework of the Family Ecological Model (FEM), which explains family factors that can influence parenting patterns to adopt a healthy lifestyle, consisting of family characteristics, children, and the child's living environment (Davison, Jurkowski and Lawson, 2013). Parental support and factors that influence appropriate movement behavior,

including physical activity, sedentary behavior, and sleep needs, according to the characteristics in Indonesia have rarely been studied. Therefore, this study aimed to analyze the determinant factors that influence parental support in the healthy movement behavior of school-aged children using a family based approach.

# **Materials and Methods**

# Design

This study employed a descriptive analytical design and a cross-sectional approach. This study was conducted between June and August 2021. The respondents in this study were mothers of school-aged children aged 9–12 years in Surabaya, East Java, and were able to access the online questionnaires.

# Sample

The inclusion criteria for this study required participants to be mothers of school-aged children who provided daily care and possessed the ability to use smartphones. The sample size was calculated using Slovin's formula, resulting in 355 respondents. This study employed a multistage random sampling technique that targeted elementary schools across various districts. The researcher randomly selected four districts within the city, and subsequently one elementary school was randomly chosen from each district to serve as the research site. From the selected schools, mothers were sampled proportionately to participate as respondents. The researcher collaborated with the schools to distribute an online questionnaire to the chosen participants.

#### Measurement tools

The independent variables were mother and family factors, including mother's age, mother's education, mother's occupation, mother's knowledge, number of children, family type, family income, mother's movement behavior characteristics, and child characteristics and characteristics of the child's environment. The dependent variable was parental support for children's healthy movement behavior.

Data were collected using questionnaires. Categorization of mothers' age was based on early adulthood (20-40 years), middle adulthood (41-60 years), and older adults (>60 years), and categorization of family income based on average minimum wage. A questionnaire to measure mothers' knowledge of healthy movement behavior was constructed by the researcher based on Bates *et al.*(2020). It consists of eight multiple-choice questions, where each correct answer scored 1 point and incorrect answers received

no points. The scores were categorized as good, sufficient, or poor. Mother's movement behavior

Table 1. The characteristics of Children, Their Mothers and Families (n=355)

| Wother's and Families Characteristics     70       20-40 years old     13     238     67.0       21-60 years old     13     32.4     20.9     20.0     2   | Characteristics  | f   | %     |
|---|--|-----|-------|
| Mother's Age     2.88     67.0       41.46 years old     115     52.4       > 600 years old     100     115       > 600 years old     100     115       > 600 years old     100     115       > 600 years old     100     137       > 600 years old     100     137       Collage     133     131       Collage     130     131       Employee     130     131       Enterprenear     123     65       Number of children     11     131       I child     51     14.4       2 childran     120     56.9       3 childran   | Mothers and Families Characteristics:                                    |     |       |
| 20-40 year old 238 67.0   >41-60 year old 115 52.4   >40 year old 2 0.6   >1000 registor 140 37.4   Data figh School 140 37.4   Sanor righ School 140 37.4   College 13 43.1   Employse 2 6.8   Employse 2 6.8   Employse 2 6.8   Coologe 113 31.8   Good 113 31.8   Good 242 66.2   Number of children 1 1   1 child 3 1.8   2 children 2 5.9   3 children 2 5.9   4 children 2 5.9   5 children 2 5.2   6 children 2 5.9   5 children 2 7.1   7 children 2 7.1   7 children 2 7.2   5 childr   | Mother's Age   |     |       |
| 4-1.6 year old   115   32.4     > 400 year old   2   0.6     Mother's Education   13   13     Mother's Cocupation   13   31     Employee   95   6.68     Enterprenear   13   83     Housering   23   68     Mother's Cocupation   13   18     Enterprenear   13   18     Good   242   66.2     Number of children   11   18     I child   51   14.4     2 children   202   56.9     3 children   7   123     4 children   10   51   14.4     2 children   202   56.9     3 children   7   123   36.5     4 children   123   34.6   34.6     1 cow hercome   123   45.3   34.6     1 cow hercome   123   45.3   34.6     1 cow hercome   123   34.6   34.2     1 cow hercome   21   5.3   5.3     1 cow hercome  | 20-40 years old  | 238 | 67.0  |
| >>60 years old     2     0.6       Junior Hijn School     20     775       Junior Hijn School     160     374       Mother's Education     153     6.7       Phother's Occupation     29     8.2       Enterpreneur     29     8.2       Houtewife     201     65       Mother's Inorwelage     7     7       Poor     202     5.6       Cool of children     1     1.4       1 child     21     6.5       1 child     21     5.9       3 children     202     5.6       1 child     21     5.9       3 children     21     5.9       2 children     22     5.7       2 children     23     5.4       2 children     23   | 41-60 years old  | 115 | 32.4  |
| Mode 's Education     42     17.5       Senior High School     140     39.4       College     95     2.6.8       Hendroyee     95     8.2.2       Housewife     231     6.5       Mother's Konveldege     113     31.8       Good     133     13.8       Good     24     68.2       Number of Children     11     14.4       1 child     21     5.5.9       3 children     21     5.5.9       4 children     21     5.9       5 children     21     5.9       5 children     21     5.9       5 children     21     5.9       5 children     21     5.0       5 children     21     5.0   | >60 years old  | 2   | 0.6   |
| junior High School     62     7.5       Senior High School     13     33.4       College     13     33.4       Horther's Occupation     93     62       Proor     13     31.8       Good     242     682       Mumber of children     1     31.8       I child     51     14.4       2 childran     20     55.9       3 childran     7     157       4 childran     12     26.5       3 childran     7     157       Family Type     7     157       Family Type     7     123       Mucher's Incoment     22     56.3       High Income     23     74.1       Notchar's Incoments     22     57.3       State of Emaily Type     74     20.8       Single Parent     74     20.8       Single Parent     22     74.1       Notoria in a day     7     22       Solouria in a day     7     23       Solouria in a dayi   | Mother's Education   |     |       |
| Senior High School     140     39.4       Collage     153     41.1       Perployee     153     43.1       Hotter's Cocupation     29     8.2       Houseworke     21     65       Mother's Innoviedge     21     66       Poor     113     31.8       Good     242     66.2       Number of children     20     56.6       1 child     1     14.4       2 children     20     56.3       3 children     22     65.3       3 children     23     39.9       3 children     23     39.8       3 children     23     39.8       High Income     22     65.3       High Income     271     76.3       Extended Family     76     23       Mother's Incomest behavior characteristics     23     24.2       Sectentary behavior     72     25.9       Extended Family     79     22.3       Solary a week     24.2     24.1  | Junior High School   | 62  | 17.5  |
| College     15     4.1       Bendpoyee     9     2.8       Enterpretar     20     6.5       Mother's howledge     11     3.18       Poor     113     3.18       Good     24     6.82       Number of children     1     1     1.44       1 child     5     1.44     2.02       2 children     2.02     5.69     3.53       3 children     7     2.03     3.53       4 children     2.0     5.69     3.53       3 children     7     1.97     7.53       High horome     2.2     6.53     3.64       Family Type     7     2.83     3.64       Nuclear family     71     7.63     2.59       Single Farent     10     2.8     2.53       Mother's Norweit behavior characteristics     2.2     2.59       Statistics (in the last 2 weeks)     2.1     2.59       Statistics (in the last 2 weeks)     2.2     2.2       Stop Mouris in a day <td< td=""><td>Senior High School</td><td>140</td><td>39.4</td></td<>  | Senior High School   | 140 | 39.4  |
| Mother's Occupation     95     2.6.3       Employee     95     2.6.3       Housevolt     231     6.0       Mother's knowledge     131.8     5.0       Good     242     6.0       Number of children     201     6.0       1 child     51     1.4.4       2 children     202     5.6,9       3 children     202     5.6,9       3 children     202     5.6,9       3 children     202     5.6,9       3 children     202     5.6,3       High Income     211     5.7       Exernoting Kange     74     20.8       Parmity Typed     74     20.8       Single Farant     74     20.8       Single   | College  | 153 | 43.1  |
| Employee     95     26.8       Enterpreneur     29     82.2       Housevile     21     65       Poor     13     31.8       Good     22     55       Mund of children     20     55.69       3 children     21     5.9       4 children     21     5.9       4 children     22     65.6       13 children     21     5.9       4 children     21     5.9       4 children     21     5.9       4 children     21     5.9       4 children     22     6.53       High Income     22     6.53       Single Family Income     27     76.3       Extended Family     74     20.8       Single Family Income     23     74.1       Nuclear family     74     20.8       Single Arauno     72     6.2       Adaya aweek     22     6.2       Not init     72     6.3       Naya aweek     86     23.   | Mother's Occupation  |     |       |
| Enterpreneur     39     8.2       Housewild     231     65       Mother's knowledge     113     31.8       Pace     24     68.2       Number of children     20     65.9       1 child     51     14.4       2 children     20.8     65.3       3 children     21     5.9       3 children     21     5.9       3 children     21     5.9       4 children     21     5.9       Family Type     7     1.97       Runkers family frype     7     7.6.3       Nachara family frype     7     2.8       Mother's novement behavior characteristics     22     5.2.5       Sedentary behavior     22     5.2.5       Limit     23     7.4     1.0.5       No Limit     23     7.4     2.3.1       Ldy a week     22     2.3.1     1.4.1       Near     16     3.2.2     2.3.1       Ldy a week     22     2.3.1     3.3.2 <tr< td=""><td>Employee</td><td>95</td><td>26.8</td></tr<>  | Employee   | 95  | 26.8  |
| Housewike     231     65       Wother's knowledge     113     31.8       Good     242     682       Number of children     1     41       2 children     21     509       3 children     21     509       4 children     21     509       4 children     21     53       4 children     21     53       4 children     21     53       4 children     21     53       4 children     232     65.3       High Income     123     346       Family Income     123     346       Extended Family     74     208       Single Farent     10     28       Mother's movement behavior characteristics     10     28       Steatned Family     74     208     21       Lays a week     22     62     23       Steatned Family     74     208     23       Steatned Family     79     23     45       Steatnet Steatnee   | Enterpreneur   | 29  | 8.2   |
| Motify incoveledge     113     3.1.8       Good     2.42     68.2       I child     51     14.4       2 children     202     53.9       3 children     202     53.9       3 children     202     53.9       3 children     21.2     53.9       4 children     21.2     53.3       Family Income     22.2     65.3       Low Income     22.2     65.3       Mother's movement behavior characteristics     71     76.3       Single Parent     10     28       Mother's movement behavior characteristics     72     6.3       Stard and Sanga week     22.2     6.2       2.3 days a week     22.2     6.2       2.3 days a week     22.2     6.2       2.4 days a week     23.0     72.2       3.4 days a week     23.0     72.2       3.4 days a week     188     53.3       Sep babaris in day     7     2.2       Sep babaris in day     7     2.2       Sep babaris in day   | Housewife  | 231 | 65    |
| Poor     113     31.8       Good     242     682       Number of children     21     5.3       1 child     1     14.4       2 children     20     5.63       3 children     21     5.3       4 children     21     5.3       4 children     21     5.3       4 children     21     5.3       5 children     7     7.9       Family Income     21     7.63       Single Parent     10     2.8       Single Parent     26.3     7.4       1 Moties from overeent behavior characteristics     22     5.2       Sedentary behavior     22     5.2     5.2       I day a week     82     2.3.1     1.0       1 day a week     82     2.3.1     1.0       1 day a week     82     2.3.1     1.0       2 day a week     7     2     6.2       3 day a week     82     2.3.1     1.0       1 day a week     82     2.3.1 <td>Mother's knowledge</td> <td></td> <td></td>   | Mother's knowledge   |     |       |
| Good     242     642       I child     51     14.4       I children     202     5.3       3 children     202     5.3       4 children     21     5.3       4 children     21     5.3       4 children     21     5.3       4 children     21     5.3       High income     21     3.4       Extended Family     7     7.6.3       Single Family Type     7     2.8       Single Family     7     2.8       Noters movement behavior characteristics     2.2     2.1       Vay a week     82     2.31     1.4     3.4     3.4       Nover     165     46.5     2.5     3.4     2.3     3.4     2.3       Nover     165     4   | Poor   | 113 | 31.8  |
| Number of children     51     144       2 children     202     56.3       3 children     21     5.3       4 children     21     5.3       3 children     21     5.3       4 children     21     5.3       5 children     22     6.3       Low Income     23     6.3       Family Income     23     6.3       Family Type     23     6.3       Single Parent     74     20.8       Single Parent     26.3     7.4       No Linit     26.3     7.4       No Linit     22     2.2       2 days aweek     22     2.2       2 days aweek     22     2.2       2 days aweek     22     2.2       1 day aweek     28     23.1       1 day aweek     18     3   | Good   | 242 | 68.2  |
| 1 child   31   14.4     2 children   20   5.6.9     3 children   21   5.9     4 children   21   5.9     *4 children   21   5.9     #igh Income   123   34.6     Family Income   123   34.6     Function tambity   74   20.8     Single Farent   10   2.8     Mother's movement behavior characteristics   74   20.8     Stop Sa meath   22   23.1   1     How min   23   403 as week   22   23.1     1 day a week   24   23.1   1   404 as week   24.2     Sa days a week   24   23.3   23.1   1   1   24.2     Sa days a week   21   53.0   24.2   24.2   24.2     Sa days a week   31  | Number of children   |     |       |
| 2 children   24   56.9     3 children   74   20.8     4 children   7   1.97     Family Income   22   65.3     High Income   23   34.6     Family Syree   7   7.6.3     Extended Family   74   20.8     Single Parent   10   2.8     Mother's movement behavior characteristics   74.1   20.8     Single Parent   10   2.8     Mother's movement behavior characteristics   74.1   No.1mit     Statistic (in the last 2 weeks)   2   2.1.1     No Limit   22   2.3.1   1.4 sy a week   22   2.1.1     Never   165   46.5   42.2   1.1   No.1mit   2.8   4.5     Step Habits (in the last 2 weeks)   86   24.2   2.1.1   1.4 sy a week   2.2   2.3.1   1.4 sy a week   2.3.1   1.4 sy a sy  | I child  | 51  | 14.4  |
| 3 children   24   2.0.8     4 children   21   5.9     > 4 children   7   1.97     Earnily Income   23   6.6.3     High Income   123   34.6     Family Type   7   7.6.3     Stended Family   74   2.0.8     Single Farent   10   2.8     Mother's movement behavior characteristics   7   2.3     Stedentary behavior   2   6.2     Limit   26.3   7.4.1     No Limit   22   6.2     2.3 days a week   22   6.2     2.3 days a week   86   2.4.2     Never   165   46.5     Siepe Habits (in the last 2 weeks)   7   2.3     3 days a week   86   2.4.2     Never   188   53     Shours in a day   79   2.3.3     6.7 hours in a day   79   2.3     6.7 hours in a day   175   49.3     Male   180   50.7     Moderate to vigorous activities   10   29  | 2 children   | 202 | 56.9  |
| 4 children   7   1.9     Family Income   123   34.6     Low Income   123   34.6     Family Type   7   1.7     Nuclear family   74   20.8     Single Farent   10   2.8     Nother's movement behavior characteristics   74.1   20.8     Single Farent   10   2.8     Nother's movement behavior characteristics   74.1   Nother's movement behavior characteristics     Stepe fabrits (in the last 2 weeks)   2   2.3   74.1     Nothmit (in the last 2 weeks)   2   2.1   1 day a week   82   2.1.1     Never   165   46.5   45.5   45.5     Step Habits (in the last 2 weeks)   7   2.2   6.3   4.6     Never   165   46.5   45.5   45.5     Step Habits (in the last 2 weeks)   188   5.3   4.6     Step Habits (in the last 2 weeks)   188   5.3   4.6     Step Habits (in the last 2 weeks)   180   5.3   4.6     Step Habits (in the last 2 weeks)   180   5.3   4.7 <t< td=""><td>3 children</td><td>74</td><td>20.8</td></t<>  | 3 children   | 74  | 20.8  |
| >3 - 4 children / 1.97   Low Income 232 65.3   Low Income 232 65.3   High Income 232 65.3   Family Type 74 20.8   Single Parent 10 2.8   Mother's movement behavior characteristics 2 6.2   Sedentary behavior 2 5.9   Limit 26.3 7.4   No Limit 22 5.9   Exercise habits (in the last 2 weeks) 2 6.2   -3 days a week 86 24.2   Never 86 24.2   Never 86 24.2   Never 165 46.5   Seep Habits (in the last 2 weeks) 7 2   -9 hours in a day 79 22.3   67 hours in a day 79 22.3   67 hours in a day 81 22.8   Child characteristics 03 29   Child star 2 week 60 45.1   3 days a week 160 45.1   3 days a week 160 45.1   -3 days a week 160 45.1   -3 days a week 160 45.1   -3 days a week 160 36.3   <   | 4 children   | 21  | 5.9   |
| Family income     232     65.3       High Income     232     65.3       High Income     233     65.3       Family Type     271     76.3       Nuclear family     74     20.8       Single Parent     10     2.8       Wother's movement behavior characteristics     26.3     74.1       Nother's movement behavior characteristics     22.3     57.2       Stended Family     72     6.2       Jad days a week     82     23.1       Notice     86     24.2       Nover     86     24.2       Step Habits (in the last 2 weeks)     7     2       Step Habits (in the last 2 weeks)     81     22.8       Child characteristics     81     22.8       Child characteristics     103     29       Child characteristics     103     29       Child characteristics     103     29       Child characteristics     103     29       Child characteristics     11     11.5       S days a week     21     5.9 </td <td>&gt;4 children</td> <td>/</td> <td>1.97</td>   | >4 children  | /   | 1.97  |
| Low Income 122 65.3<br>Family Type 77 76.3<br>Extended Family 77 76.3<br>Extended Family 77 76.3<br>Extended Family 77 20.8<br>Single Parent 10 2.8<br>Mother's movement behavior characteristics 2<br>Sedentary behavior<br>Lunit 10 2.8<br>Mother's movement behavior characteristics 2<br>Sedentary behavior 10 2.8<br>Sedentary 10 | Family income  | 222 |       |
| High Income 123 34.6   Nuclear family 271 76.3   Nuclear family 74 20.8   Single Parent 10 2.8   Nother's movement behavior characteristics 92 25.9   Sectarary behavior 92 25.9   Unit 22 6.2   2.3 days a week 82 23.1   1 day a week 86 24.2   Never 165 44.5   Step Habits (in the last 2 weeks) 7 2   2.4 days a week 82 23.1   1 day a week 86 24.2   Never 165 44.5   Step Habits (in the last 2 weeks) 7 2   2.9 hours in a day 7 2   2.6 hours in a day 7 2.8   2.7 hours in a day 7 2.8   2.8 ob hours in a day 81 22.8   3.10 day a week 105 3.3   3.6 hours in a day 81 22.8   Child characteristics 103 29   Child characteristics 11 15   Step days a week 21 5.9   1.2 days a week 21 5.9   1.3 days a week 21 5   | Low Income   | 232 | 65.3  |
| Family 19pe     71     76.3       Nuclear family     74     20.8       Single Parent     10     2.8       Mother's movement behavior characteristics     74     20.8       Sedentary behavior     21     7.1       Unit     26.3     7.1       No Limit     23     37.1       No Limit     22     5.9       Exercise habits (in the last 2 weeks)     22     6.2       3 days a week     82     23.1       1 day a week     86     24.2       Netwer     165     46.5       Sheep Habits (in the last 2 weeks)     7     2       -9 hours in a day     79     23.3       67-hours in a day     188     53       67-hours in a day     180     50.7       Child dender     175     49.3       Fermale     175     49.3       Mole     180     50.7       Moterate to vigorous activities     180     50.7       Never     10     92     25.9       1-2 days a week<  | High Income  | 123 | 34.6  |
| Nuclear family     2/1     7/4     20.8       Single Parent     10     2.8       Mother's movement behavior characteristics         Sectentary behavior     2     2.5.9       Linit     2     6.2     2.3 days a week     22     6.2       2.3 days a week     22     6.2     2.3 days a week     22     6.2       1 day a week     22     6.2     2.3 days a week     22     6.2       Steep Habits (in the last 2 weeks)     22     6.4     2.3     6.5       Steep Habits (in the last 2 weeks)     86     2.3     6.7     7     2.3       Steep Habits (in the last 2 weeks)     168     5.3     45.5     5       Steep Habits (in the last 2 weeks)     188     5.3     5     6     5     5     16     45.5       Steep Habits (in the last 2 weeks)     188     5.3     5     16     5     3     5     16     45.1     15     45.3     5     16     45.1     15     16     45.1     15  | Family Type  | 271 | 74.0  |
| Extended Family     74     208       Single Prent     10     2.8       Mother's movement behavior characteristics   | Nuclear family   | 271 | /6.3  |
| Image Parent     10     2.8       Mother's movement behavior characteristics     5     5     7.1       Sedentary behavior     26.3     7.4.1       Unit     22.3     25.9       Participation of the last 2 weeks)     22     6.2       3.1     1 day a week     20     23.1       1 day a week     26     23.1       Never     165     46.5       Sleep Habits (in the last 2 weeks)     7     2       So hours in a day     7     2.3     3       8-9 hours in a day     7     2.3     3       6-10 hours in a day     188     53     5       Child characteristics     180     50.7     16       Male     175     49.3     160     45.1       1 days a week     160     45.1     15     14.4       Linit (the physical activities     11     14.4     15  | Extended Family  | /4  | 20.8  |
| Child end     26     74.1       Sedentary behavior     22     2.5.9       Limit     23     34 bys a week     22     6.2       3-3 days a week     82     23.1     1 day a week     86     24.2       Ne timit     86     24.2     6.2     2.3 days a week     86     24.2       Never     86     24.2     6.2     2.3 days a week     86     24.2       Never     86     24.2     6.2     2.3 days a week     86     24.2       Never     86     70     7     2     8.9     53     54.5       Sept habits (in the last 2 weeks)     88     53     54.5     53     54.5       Sept carbits data day     77     72     2.8     79.0     79     22.3     63.5     7.5     7.5     7.5     7.5     7.5     7.5     7.5     7.5     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7     7.7  | Single Parent  | 10  | 2.8   |
| Secentary behavior     243     74.1       No Limit     22     25.9       Exercise habits (in the last 2 weeks)     22     6.2       23 days a week     86     24.2       Never     86     24.2       Sep Habits (in the last 2 weeks)     7     2       Sep Insurs in a day     7     2.3       6-7 hours in a day     79     2.3       6-6 hours in a day     188     53       5-6 hours in a day     180     50.7       Male     180     50.7       Male     180     50.7       Male     103     29       Never     103     29       1-2 days a week     41     11.5       3 days a week     21     5.9       1-3 days a week     22     25.9       Every day   | Mother's movement behavior characteristics                               |     |       |
| Limit   263   74.1     No Limit   92   259     Exercise habits (in the last 2 weeks)   2   6.2     2.3 days a week   82   23.1     1 day a week   86   24.2     Never   165   46.5     Sheep Habits (in the last 2 weeks)   165   46.5     Sheep Habits (in the last 2 weeks)   7   2     -9 hours in a day   7   2     6.7 hours in a day   7   2     6.7 hours in a day   81   22.8     Child dender   180   50.7     Female   180   50.7     Male   180   50.7     Moderate to vigorous activities   180   50.7     Never   180   50.7     I.3 days a week   41   11.5     3 days a week   51   14.4     Never   13   59     Never   21   5.9     1.3 days a week   22   25.9     Every day   24   68.2     Children's sleep habits   14   60.3  | Sedentary benavior   | 2/2 | 74 1  |
| No Lumit     72     2.5.9       Exercise habits (in the last 2 weeks)     22     6.2       -3 days a week     82     23.1       1 day a week     86     24.2       Never     165     46.5       Sleep Habits (in the last 2 weeks)     7     2       -9 hours in a day     7     2.23       6.7 hours in a day     79     22.3       6.7 hours in a day     79     22.3       6.7 hours in a day     79     22.3       6.7 hours in a day     81     22.8       Child gender     175     49.3       Female     175     49.3       Molerate to vigorous activities     100     50.7       Never     103     29       1-2 days a week     160     45.1       3 days a week     14     11.5       3 days a week     14     11.5       3 days a week     21     5.9       1.4 days a week     22     5.9       Every day     24     68.2       1.4 days a week     21<  |  | 263 | 74.1  |
| 21 days a week     22     6.2       23 days a week     82     23.1       1 day a week     86     24.2       Never     165     46.5       Sileep Habits (in the last 2 weeks)     7     2       29 hours in a day     7     2       8-9 hours in a day     79     22.3       6-7 hours in a day     88     53       6-7 hours in a day     188     53       6-7 hours in a day     188     53       6-7 hours in a day     180     50.7       Male     180     50.7       Meer     180     50.7       Male     180     50.7       Male     180     50.7       Never   | No Limit<br>Europeire hebite (in the last 2 meeter)                      | 92  | 25.9  |
| -23 days week   22 day     23 days week   86 24.2     Never   165 46.5     Sleep Habits (in the last 2 weeks)   165     -> hours in a day   7 2     -> hours in a day   79 22.3     -> To burs in a day   79 22.3     -> To hours in a day   188 53     -> formal day   81 22.8     Child characteristics   103 29     -12 days a week   103 29     -1-2 days a week   11 1.5     > 3 days a week   51   14.4     Light physical activities   11     Never   21 5.9   59     -1-3 days a week   51   14.4     Light physical activities   136   38.3     Never   21 5.9   59     Ver   21 5.9   59     Ver of ady   214 60.3   59     -1-3 days a week   136 38.3   31     -9 hours in a day   5   1.4  | Exercise habits (in the last 2 weeks)                                    | 22  | ( )   |
| 1 day a week   62   23.1     1 day a week   86   24.2     Never   165   46.5     Sleep Habits (in the last 2 weeks)   7   2     >9 hours in a day   79   22.3     6-7 hours in a day   88   53     6-7 hours in a day   81   22.8     Child denatceristics   81   22.8     Child gender   180   50.7     Female   175   49.3     Male   180   50.7     Moderate to vigorous activities   180   50.7     Never   103   29     1-2 days a week   160   45.1     3 days a week   51   14.4     Light physical activities   1   11.5     Never   21   5.9   5.9     Every day   242   68.2     Children's sleep habits   1   14.4     Light physical activities   1   1     Never   136   38.3     9-11 hours in a day   16   60.3     9-11 hours in a day   5   1.4  | 2 2 days a week  | 22  | 0.2   |
| Never   000   24-2     Never   165   465     Sieep Habits (in the last 2 weeks)   7   2     >9 hours in a day   79   22.3     67 hours in a day   188   53     <6 hours in a day  | Z-3 days a week  | 82  | 23.1  |
| Never     103     7     2       >9 hours in a day     7     2       8-9 hours in a day     79     22.3       6-7 hours in a day     88     53       <6 hours in a day   | l day a week   | 86  | 24.Z  |
| >> hours in a day   7   2     >> hours in a day   79   22.3     6-7 hours in a day   81   22.8     Child characteristics   81   22.8     Child characteristics   180   50.7     Male   175   49.3     Male   180   50.7     Moderate to vigorous activities   180   50.7     Mever   103   29     1-2 days a week   41   11.5     3 days a week   51   14.4     Light physical activities   11   11.5     Never   21   5.9     1-3 days a week   21   5.9     1-3 days a week   242   68.2     Children's sleep habits   11   14.4     Vigors in a day   242   68.2     Children's sleep habits   136   38.3     9-11 hours in a day   214   60.3     9-9 hours in a day   214   60.3     9-9 hours in a day   176   49.6     Personal gadgets   177   50.4     Mave   179   50.4 <td>Never<br/>Sloop Habits (in the last 2 weeks)</td> <td>165</td> <td>40.5</td>  | Never<br>Sloop Habits (in the last 2 weeks)                              | 165 | 40.5  |
| > Plots in a day   7   2     8-9 hours in a day   188   53     6-7 hours in a day   81   22.8     Child characteristics   81   22.8     Child gender   175   49.3     Female   175   49.3     Male   180   50.7     Moderate to vigorous activities   180   50.7     Never   103   29     1-2 days a week   160   45.1     3 days a week   41   11.5     >3 days a week   51   14.4     Light physical activities   10   29     Never   21   59   59     1-3 days a week   92   25.9     Every day   242   68.2     Children's sleep habits   136   38.3     <9   | Sleep Habits (in the last 2 weeks)                                       | 7   | n     |
| b > Hours in a day1722.3 $67$ hours in a day8122.8Child characteristics8122.8Child gender17549.3Female17549.3Male18050.7Moderate to vigorous activities10329I-2 days a week16045.13 days a week4111.5> 3 days a week5114.4Light physical activities1159Never215.91-3 days a week215.91-3 days a week215.91-3 days a week2160.3Never13638.3-9 hours in a day51.4Veer13638.3-9 hours in a day51.4Have a habit of looking at gadgets before going to bed:17950.4Yes17649.6176Personal gadgets17649.6Have18451.4Do not have17148.2Characteristics of the Child's Environment171Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available<   | 29 hours in a day  | 79  | 2 2 2 |
| of hours in a day     100     55       <6 hours in a day  | 6-7 hours in a day   | 199 | 53    |
| Condust and aday     Condust and aday     Condust and aday     Condust and aday       Child gender     175     49.3       Female     180     50.7       Male     180     50.7       Moderate to vigorous activities     103     29       Never     103     29       1-2 days a week     160     45.1       3 days a week     41     11.5       >3 days a week     51     144       Light physical activities     102     25.9       Never     21     5.9       1-3 days a week     21     5.9       Light physical activities     114     11.5       Never     21     5.9     25.9       Every day     242     68.2     160       Children's sleep habits     136     38.3       -9 hours in a day     14     60.3       >9 hours in a day     14     60.3       >9 hours in a day     179     50.4       Yes     176     49.6       Personal gadgets     171     48.2  | 6-7 Hours in a day   | 21  | 22    |
| Child genderFemale17549.3Male18050.7Moderate to vigorous activities18049.1Never103291-2 days a week16045.13 days a week4111.5>3 days a week5114.4Light physical activities2159Never21591-3 days a week2225.9Every day24268.2Children's sleep habits338.39-11 hours in a day3638.39-11 hours in a day51.4Have a habit of looking at gadgets before going to bed:17950.4Not17950.476Yes18451.4Do not have17148.2Characteristics of the Child's Environment24368.5Availabile24368.5Not Available24368.5Not Available24368.5Not Available24368.5Not Available11231.5Availability of a safe play area in the home environment43Availability of a safe play area in the home environment6317.7  | Child characteristics  | 61  | 22.0  |
| Female     175     49.3       Male     180     50.7       Moderate to vigorous activities     103     29       I-2 days a week     160     45.1       3 days a week     41     11.5       >3 days a week     51     14.4       Light physical activities     103     29       Never     21     5.9       1-3 days a week     21     5.9       Every day     242     68.2       Children's sleep habits     136     38.3       9-11 hours in a day     214     60.3       9-11 hours in a day     176     49.6       Personal gadgets     176     49.6       Have a habit of looking at gadgets before going to bed:     179     50.4       Not     179     50.4     176       Yes     171     48.2     14       Do not have     171     48.2   | Child gender   |     |       |
| Male   103   103     Moderate to vigorous activities   103   29     Never   103   29     1-2 days a week   160   45.1     3 days a week   41   11.5     > 3 days a week   41   11.5     > 3 days a week   51   14.4     Light physical activities   21   5.9     Never   21   5.9     Every day   242   68.2     Children's sleep habits   214   60.3     <9 hours in a day   | Female   | 175 | 49 3  |
| Nate     100     30,7       Moderate to vigorous activities     103     29       1-2 days a week     160     45,1       3 days a week     41     11,5       > 3 days a week     51     14,4       Light physical activities     7     5,9       Never     21     5,9       1-3 days a week     92     25,9       Every day     242     68,2       Children's sleep habits     7     24,2       <9 hours in a day  | Male   | 180 | 50.7  |
| Never103291-2 days a week16045.13 days a week4111.5>3 days a week5114.4Light physical activities114.4Light physical activities215.91-3 days a week9225.9Every day24268.2Children's sleep habits13638.39-11 hours in a day13638.39-11 hours in a day51.4Have a habit of looking at gadgets before going to bed:17950.4Yes17649.617148.2Characteristics of the Child's Environment17148.2171Availability of television or other electronic items in the child's room11231.5Availability of a safe play area in the home environment6317.7171Availability of a safe play area in the home environment6317.7171Availabile6317.5171175Availabile6317.5175175Availabile6317.5175175Availability of a safe play area in the home environment172175175Availabile6317.5175175Availabile6317.5175175Availabile6317.5175175Availabile6317.5175175Availabile6317.5175175Availabile6317.5175175  | Moderate to vigorous activities  | 100 | 50.7  |
| 1-2 days a week   160   45.     3 days a week   41   11.5     3 days a week   51   14.4     Light physical activities   7   1.2     Never   21   5.9     1-3 days a week   92   25.9     Every day   242   68.2     Children's sleep habits   214   60.3     <9 hours in a day  | Never  | 103 | 29    |
| 1 - Loging in real.   100   10.1     3 days a week   41   11.5     >3 days a week   51   14.4     Light physical activities   21   5.9     I-3 days a week   92   25.9     I-3 days a week   92   25.9     Every day   242   68.2     Children's sleep habits   3   3.3     <9 hours in a day   | I-2 days a week  | 160 | 45 1  |
| >3 days a week   51   14.4     Light physical activities   7   5.9     Never   21   5.9     1-3 days a week   92   25.9     Every day   242   68.2     Children's sleep habits   7   136   38.3     <9 hours in a day   | 3 days a week  | 41  | 11.5  |
| Light physical activities<br>Never 21 5.9<br>1-3 days a week 22 25.9<br>Every day 242 68.2<br>Children's sleep habits<br><pre><pre><pre><pre><pre><pre><pre><pre></pre></pre></pre></pre></pre></pre></pre></pre>   | >3 days a week   | 51  | 14.4  |
| Instruction215.9Never215.91-3 days a week9225.9Every day24268.2Children's sleep habits3638.39 hours in a day13638.39-11 hours in a day21460.3>9 hours in a day51.4Have a habit of looking at gadgets before going to bed:17950.4Not17950.4176Yes17649.6Personal gadgets17148.2Have18451.4Do not have17148.2Characteristics of the Child's Environment24368.5Not Available11231.5Availability of a safe play area in the home environment6317.7Available6317.780.3Not Available6317.7  | Light physical activities  | •   |       |
| 1-3 days a week9225.9Every day24268.2Children's sleep habits $242$ 68.2   | Never  | 21  | 5.9   |
| Every day24268.2Children's sleep habits   | I-3 days a week  | 92  | 25.9  |
| Children's sleep habits13638.39 hours in a day13638.39-11 hours in a day21460.3>9 hours in a day51.4Have a habit of looking at gadgets before going to bed:7Not17950.4Yes17649.6Personal gadgets184Have18451.4Do not have17148.2Characteristics of the Child's Environment24368.5Not Available11231.5Availability of a safe play area in the home environment6317.7Available6317.7Not Available6317.7   | Every day  | 242 | 68.2  |
| <9 hours in a day   | Children's sleep habits  |     |       |
| 911 hours in a day21460.3>9 hours in a day51.4Have a habit of looking at gadgets before going to bed:17950.4Not17950.4Yes17649.6Personal gadgets18451.4Do not have17148.2Characteristics of the Child's Environment24368.5Availability of television or other electronic items in the child's room11231.5Available11231.531.5Availability of a safe play area in the home environment6317.7Available6317.739292.3   | <9 hours in a day  | 136 | 38.3  |
| >9 hours in a day   5   1.4     Have a habit of looking at gadgets before going to bed:   179   50.4     Not   176   49.6     Personal gadgets   176   49.6     Have   184   51.4     Do not have   171   48.2     Characteristics of the Child's Environment   171   48.2     Availability of television or other electronic items in the child's room   243   68.5     Not Available   112   31.5     Availability of a safe play area in the home environment   63   17.7     Available   63   17.7  | 9-11 hours in a day  | 214 | 60.3  |
| Have a habit of looking at gadgets before going to bed:Not17950.4Yes17649.6Personal gadgets18451.4Do not have17148.2Characteristics of the Child's EnvironmentAvailability of television or other electronic items in the child's room24368.5Not Available11231.5Availability of a safe play area in the home environment6317.7Available6317.7  | >9 hours in a day  | 5   | 1.4   |
| Not17950.4Yes17649.6Personal gadgets17148.2Have18451.4Do not have17148.2Characteristics of the Child's Environment24368.5Available11231.5Availability of a safe play area in the home environment6317.7Available6317.7  | Have a habit of looking at gadgets before going to bed:                  |     |       |
| Yes17649.6Personal gadgets18451.4Have18451.4Do not have17148.2Characteristics of the Child's EnvironmentAvailability of television or other electronic items in the child's room24.368.5Not Available11231.5Availability of a safe play area in the home environment6317.7Available6317.7   | Not  | 179 | 50.4  |
| Personal gadgets   184   51.4     Have   171   48.2     Do not have   171   48.2     Characteristics of the Child's Environment   243   68.5     Availability of television or other electronic items in the child's room   243   68.5     Not Available   112   31.5     Availability of a safe play area in the home environment   63   17.7     Available   63   17.7  | Yes  | 176 | 49.6  |
| Have18451.4Do not have17148.2Characteristics of the Child's EnvironmentAvailability of television or other electronic items in the child's room24368.5Not Available11231.5Availability of a safe play area in the home environment6317.7Available6317.7   | Personal gadgets   |     |       |
| Do not have 171 48.2   Characteristics of the Child's Environment 48.2   Availability of television or other electronic items in the child's room 48.2   Available 24.3 68.5   Not Available 11.2 31.5   Availability of a safe play area in the home environment 63 17.7   Available 63 17.7   | Have   | 184 | 51.4  |
| Characteristics of the Child's Environment   Availability of television or other electronic items in the child's room     Availabile   243   68.5     Not Available   112   31.5     Availability of a safe play area in the home environment   63   17.7     Available   292   292   292   | Do not have  | 171 | 48.2  |
| Availability of television or other electronic items in the child's room   243   68.5     Available   112   31.5     Availability of a safe play area in the home environment   63   17.7     Available   63   29.2   92.3  | Characteristics of the Child's Environment                               | -   |       |
| Available24368.5Not Available11231.5Availability of a safe play area in the home environment6317.7Available6329292.3  | Availability of television or other electronic items in the child's room |     |       |
| Not Available 112 31.5   Availability of a safe play area in the home environment 63 17.7   Available 63 292 92.3   | Available  | 243 | 68.5  |
| Availability of a safe play area in the home environment       Available     63     17.7       National Available     292     92.3  | Not Available  | 112 | 31.5  |
| Available 63 17.7   | Availability of a safe play area in the home environment                 |     | -     |
|   | Available  | 63  | 17.7  |
| Not Available 272 02.3  | Not Available  | 292 | 82.3  |

characteristics including sedentary behavior, exercise habits, sleep habits; The characteristics of children refer to those of children aged 9-12 years, If a mother has more than one child within this age range, the oldest child will be selected for assessment. The child characteristics included gender, characteristics of the child's movement behavior (moderate to vigorous physical activity, light physical activity, and sleep duration), and personal gadgets. The questionnaire for children's movement behavior was developed based on WHO (2020) and Guan et al. (2020). It includes questions regarding the total time each day the child spent watching TV, using gadgets, and playing games outside. For moderate to vigorous physical activity, respondents were asked how many days in a week their child engaged in such activities for 60 minutes a day, with answer options of Never, 1-2 days a week, 3 days a week, and less than 3 days a week. For light physical activity, the question was how many days in a week the child participated in light activities for a certain number of hours per day, with answer options of Never, 1-3 days a week, or every day. Additionally, the questionnaire asked about the average duration of the child's deep sleep over 24 hours, with response options of < 9 hours per day, 9-11 hours per day, or > 11 hours per day.

The environmental characteristics and instruments include the availability of electronic media, specifically television in the child's bedroom, with answer options of yes or no, as well as safe residential access and play areas, and the ownership of screen media based on Nurwitanti (2019). This is measured by the availability of safe play spaces for children with the following criteria: (1) the presence of a large area or field, (2) the presence of safe and sturdy play equipment, (3) the absence of objects or materials that pose injury risks, (4) supervision by an adult, and (5) a home environment with minimal vehicle traffic. The ownership of screen media consisted of questions about whether the child owned personal gadgets and the habit of playing with gadgets before bedtime, both with answer options of yes or no.

Parental support was assessed using the Parental Support of Children's Movement Behaviors Questionnaire (Rhodes *et al.*, 2019), this questionnaire consists of support for children's physical activity, support for preventing sedentary behavior, and support for meeting children's sleep needs. The questionnaire includes two questions regarding each parameter. The scoring for each question was as follows: never/rarely = 1, 1-2 times per week = 2, 3-4 times per week = 3; almost every day = 4; every day = 5.

The questionnaire was translated into Indonesian and subjected to validity and reliability testing. Each question item demonstrated a calculated r-value exceeding 0.361, indicating validity. Furthermore, the overall reliability of the questionnaires was confirmed, with reliability coefficients of greater than 0.61. Eligible mothers had access to both questions after providing informed consent online. After obtaining consent, the mother completed and submitted both the online questionnaires. The average time required for the responders to complete the questionnaire was 20 min.

# Data Analysis

Multivariate analysis was performed with logistic regression tests using binary logistic regression tests with backward elimination procedures (p <0.05) to identify the independent factors that had the greatest impact on the dependent variable.

# Ethical considerations

Ethical clearance was granted by the Health Research Ethics Committee of the Faculty of Nursing, Universitas Airlangga (grant number 2285-KEPK). This research strictly implements ethical principles, before filling out the questionnaire the researcher explains the aims and objectives of the research, respondent rights and research procedures. The questionnaires were accessed by eligible mothers after obtaining informed consent, contained in an online form. Once consent was obtained, the mothers completed and submitted both the questionnaires online. The time required for respondents to complete the questionnaires was approximately 20 min.

# Results

The characteristics of children, their mothers and families

According to the characteristics of the mothers and families, the results of this study indicate that most families are nuclear families (76.3%, n=271). The majority of the mothers held a college degree (43%, n=153), good knowledge (68.2%, n= 242), were housewives (65%, n=231), between the ages of 20 and 40 years (67%, n=238), most of them having a low income (65.3%, n=232). More than half of the families had two children (56.9%, n=202). Among the mothers, 74.1% reported limiting their sedentary time (n=263), whereas 46.5 percent of these mothers reported never exercising (n=165). More than half of mothers (53 %, n=188) sleep 6-7 hours per day. On the other hand, 50.7 percent (n=180) of the children in this study were boys and engaged in moderate to intense exercise 1-2 days

#### Rachmawati, Krisnana, Pradanie, Qur'aniati, Arief, Biru, Asih, Rithpho, and Kurnia (2024)

| Parental Support Behavior       | f   | %    | Mean | SD    |
|---------------------------------|-----|------|------|-------|
| Moderate to vigorous activities |     |      |      |       |
| Not support                     | 301 | 84.1 | 1.15 | 0.359 |
| Support                         | 54  | 15.1 |      |       |
| Light Activity                  |     |      |      |       |
| Not support                     | 141 | 39.4 | 1.60 | 0.49  |
| Support                         | 214 | 59.8 |      |       |
| Good sleep habit                |     |      |      |       |
| Not support                     | 71  | 19.8 | 1.80 | 0.40  |
| Support                         | 284 | 79.3 |      |       |
| Prevent sedentary behavior      |     |      |      |       |
| Not support                     | 76  | 21.2 | 1.78 | 0.41  |
| Support                         | 279 | 77.9 |      |       |

per week (45.1%, n=120). The majority of them engaged in light activity daily (68.2%, n=242) and slept between 9 and 11 h per day (60.3%, n=214). The environment was mostly available with television or other electronic items in the bedroom, at 68.5% (n=243), while safe play areas, most were not available (82.3%, n=292). The characteristics of Children, their mothers and Families are detailed table 1.

# Parental support behavior

Based on parental support behavior, the majority of mothers did not support moderate-to-heavy activities (84%, n=301);, however majority supported light activity 59.8% (n=214), good sleep habits 79.3% (n=284), and prevented sedentary behavior 77.9% (n=279) in their children. Parental support behavior is detailed in table 2.

Multivariate analysis results of factors that influence parental support for school-age children's movement behavior

Table 3 presents the findings from the multivariate analysis conducted in this study. The analysis indicated that the child's individual engagement in light activities was the principal factor influencing parental support for such activities on a weekly basis. Mothers with children

| Table 3 Multivariate an | alvsis results of factor | s that influence parenta | l support for school-as | e children's movement | behavior $(n=355)$ |
|-------------------------|--------------------------|--------------------------|-------------------------|-----------------------|--------------------|
|                         |                          | s that minucine parenta  |                         |                       |                    |

| Ma dahla                                | P      | 0.0  | 95% CI |       |         |
|---|--------|------|--------|-------|---------|
| Variable                                | в      | OR   | Lower  | Upper | p-value |
| Support for children's light activities |        |      |        |       |         |
| Children's light activity per week      |        |      |        |       |         |
| Never                                   |        |      |        |       | <0.001  |
| I-3 days per week                       | -      | -    | -      | -     | 0.14    |
| Every day                               | 0.81   | 2.25 | 0.76   | 6.67  | 0.00    |
|   | 2.04   | 7.70 | 2.72   | 21.84 | 0.02    |
| Support for moderate to vigorous        |        |      |        |       |         |
| activities                              |        |      |        |       |         |
| Mother's exercise                       |        |      |        |       | 0.03    |
| Never                                   | -      | -    | -      | -     | -       |
| I day per week                          | - 0.42 | 0.65 | 0.26   | 1.63  | 0.36    |
| 2-3 days per week                       | 0.49   | 1.64 | 0.75   | 3.55  | 0.21    |
| >3 days per week                        | 1.21   | 3.37 | 1.18   | 9.65  | 0.02    |
| Children's sports                       |        |      |        |       | 0.03    |
| Never                                   | -      | -    | -      | -     | -       |
| I day per week                          | 1.32   | 3.75 | 1.34   | 10.46 | 0.01    |
| 2-3 days per week                       | 1.06   | 2.89 | 0.79   | 10.55 | 0.10    |
| >3 days per week                        | 1.64   | 5.18 | 1.64   | 16.26 | <0.001  |
| Personal gadgets                        |        |      |        |       |         |
| Do not have                             | -      | -    | -      | -     | -       |
| Have                                    | - 0.79 | 0.45 | 0.23   | 0.86  | 0.01    |
| Support preventing sedentary            |        |      |        |       |         |
| behaviors                               |        |      |        |       |         |
| Knowledge                               |        |      |        |       |         |
| Poor                                    | -      | -    | -      | -     | -       |
| Good                                    | 0.85   | 2.33 | 1.34   | 4.05  | <0.001  |
| Mother's sleep duration                 |        |      |        |       | 0.02    |
| <6 hours                                | -      | -    | -      | -     | -       |
| 6-7 hours                               | 0.89   | 2.46 | 1.27   | 4.75  | 0.00    |
| 8-9 hours                               | 0.15   | 1.17 | 0.56   | 2.41  | 0.67    |
| >9 hours                                | - 0.10 | 0.89 | 0.17   | 4.82  | 0.89    |
| Personal gadgets                        |        |      |        |       |         |
| Do not have                             | -      | -    | -      | -     | -       |
| Have                                    | -0.60  | 0.55 | 0.31   | 0.958 | 0.03    |
| Support for adequate and regular sleep  |        |      |        |       |         |
| Children's light activities             |        |      |        |       | 0.03    |
| Never                                   | -      | -    | -      | -     | -       |
| I-3 days                                | 0.73   | 2.08 | 0.73   | 5.96  | 0.16    |
| Every day                               | 1.23   | 3.42 | 1.27   | 9.23  | 0.01    |
| Personal gadgets                        |        |      |        |       |         |
| Do not have                             | -      | -    | -      | -     | -       |
| Have                                    | -0.83  | 0.44 | 0.24   | 0.79  | < 0.001 |

504 P-ISSN: 1858-3598 • E-ISSN: 2502-5791

who engaged in light activities one to three days per week were 2.25 times more likely to support light activities than mothers with children who never engaged in light activities per week (OR=2.25, 95% CI= 0.76-6.67). The mother's support for the child's moderate-to-vigorous activity was influenced by the mother's and children's own exercise activities, as well as the children's gadget ownership. Mothers who exercised more than three days per week were 3.37 times more likely to support moderate-to-heavy activities for school-aged children compared to mothers who never exercised in one week (OR= 3.37; 95%CI= 1.18-9.65). Mothers whose children regularly exercised more than three days per week will be 5.18 times more supportive of moderate to vigorous activities, compared to mothers whose children never exercised (OR=5.18; 95% CI= 1.65-16.26), whereas mothers whose children regularly exercised once per week will be 3.75 times more supportive of moderate to vigorous activities than mothers whose children never exercised. Mothers with children who have gadgets will be 0.45 times less likely to support moderate to vigorous activities than mothers with children who do not have personal gadgets (OR=0.45, 95% CI= 0.23-0.86).

Mothers' support for preventing school-aged children's sedentary behavior was influenced by factors such as their knowledge, sleep duration, and gadget ownership. Mothers who have good knowledge were 2.33 times more supportive of appropriate screen time activities, compared to mothers who have sufficient knowledge (OR=2.33; 95% CI= 1.34-4.05). Mothers who have adequate and regular sleep time were 2.46 times more likely to support healthy screen time than mothers who do not have adequate and regular sleep (OR=2.46; 95% CI=1.27-4.75). Mothers with children who have personal gadgets will be 0.55 times less likely to support preventing sedentary activities compared to mothers with children who do not have personal gadgets (OR=0.54; 95% CI= 0.31-0.95).

It was found that children's light activity and ownership of personal gadgets had a relationship with support for adequate and regular sleep. Children's daily light activity had a significant relationship with a p-value of 0.015 ( $\alpha$ <0.05). Mothers with children who had light activity every day were 3.42 times more likely to support adequate and regular sleep time than children who never did light activity for one week (OR: 3.42; 95% CI: 1.27-9.23). Mothers with children who had personal gadgets were 0.44 times less likely to support adequate and regular sleep activities, compared to mothers with

children who did not have personal gadgets (OR: 0.44; 95%CI= 0.24-0.79).

# Discussions

Mothers who are active in exercising more than three days a week will be more supportive of their children's moderate-to-vigorous activities. Parental mothers are role models for their children (Coto et al., 2019). According to a study by Neshteruk (Neshteruk et al., 2020), parents who support their children's activities have the highest score in motivating their children to participate in sports and other activities. Additionally, this type of parent can effectively manage how long a child spends focusing on a screen (Kaehler, Jacobs and Jones, 2016). According to Vaughn's study (Vaughn, Hales and Ward, 2013), parental assessment of children's sports activities is also related to children's activities, which can enhance their children's motivation to engage in sports by exemplifying positive sportsmanship, providing opportunities for their children to observe them exercising, encouraging discussions about sports, participating in physical activities together, and fostering enjoyment in these shared experiences. Furthermore, mothers' encouragement, such as verbal praise, practical assistance, family activities, and explicit modelling, can help boost children's desire to be physically active. In a different study, it was also stated that the motivation of parents to engage in physical exercise was linked to the motivation of children to engage in physical activity, as well as the intensity of activity (Lucas et al., 2021). In contrast to mothers who do not engage in physical exercise, this study indicates that some mothers do not support moderate-to-vigorous activities. This may be due to the difficulties faced by mothers who do not exercise while serving as role models and motivating their children to participate in physical activities. Although the majority of mothers in this study were highly educated, factors such as time constraints and the demands of their professional commitments may have contributed to this lack of support (Al Yazeedi et al., 2021).

Good maternal knowledge is more supportive in preventing sedentary behavior in children. Those who are knowledgeable about appropriate screen time limits are more effective in managing their children's engagement in sedentary activities, while others who possess knowledge about healthy lifestyles tend to exhibit healthy habits in their daily lives (Marciano, Petrocchi and Camerini, 2020). This is consistent with our findings, which showed that mothers who obtain sufficient sleep are more likely to control their children's sedentary activities. Previous research indicates that children's activity levels are influenced by their parents' sleep habits, particularly those of their mothers (Zhang et al., 2010), and sedentary behavior is related to adequate sleep duration (Souza et al., 2022). Children who experience insufficient sleep are often affected by their parents' lack of sleep as parents serve as role models for their children at home. Parental lifestyle significantly impacts daily habits within the family, including both sedentary lifestyles and sleep adequacy (Coto et al., 2019). However, children's personal gadget ownership reduces parental support in preventing sedentary activity. Children of mothers who are permissive to screentime are more sedentary than those of mothers who participate in sports (Neshteruk et al., 2020). Parents who facilitate their children's use of personal devices provide opportunities to engage in activities such as watching videos and playing games (Chang and Lei, 2021). This behavior increases sedentary activity, characterized by prolonged sitting or lying down, and decreases children's movement behavior (Hanifah, Nasrulloh and Sufyan, 2023). Previous research has found that some parents justify facilitating their children's use of gadgets for purposes such as completing school assignments, keeping their children indoors, encouraging them to eat, and other reasons that allow parents to have time for themselves (Koirala et al., 2021).

Mothers with children who engage in light activities every day are more supportive of adequate and regular sleep time than mothers with children who never engage in light activities for one week. In line with previous research, there was a relationship between sleep duration and physical activity in children (Williams et al., 2014). This study indicates that active children who engage in high levels of physical activity throughout the day tend to have shorter sleep durations than their inactive peers. However, further investigation is needed to determine whether reduced sleep duration is correlated with lower sleep quality. These findings align with other studies suggesting that a higher proportion of vigorous physical activity during the day may disrupt sleep patterns (Ekstedt et al., 2013). This is contrary to the phenomenon post the pandemic and the current digital era that brings new habits, where there is a decrease in physical activity accompanied by a decrease in sleep duration (Margaritis et al., 2020), which is related to the use of digital media, which is difficult to let go of. The study findings indicate that personal gadget ownership is related to mothers' support in

preventing children's sedentary activities. Children who have personal gadgets tend to have longer screen times than children who do not have personal gadgets (Koirala et al., 2021). A long screen time has an impact on the child's sleep duration, which will decrease and be poor in quality. These results are consistent with the metaanalysis results conducted by Jansen (Janssen et al., 2020) that screen time has an adverse relationship with children's sleep patterns. It has been reported that short-range light waves (blue/green light) emitted from the screen suppress pineal melatonin secretion, which can affect the circadian cycle (via supra-chiasmatic nucleus signals) and sleep onset (via the hypothalamic ventrolateral pre-optic nucleus) (Higuchi et al., 2014) (Chang et al., 2014). Children who allocate more time to screens often participate in more social and educational activities. However, excessive and unrestricted screen time can negatively impact cognitive development and disrupt sleep (Lucas et al., 2021); which is also in line with (Hale and Guan, 2015). Screen time, such as gaming and watching videos, negatively affects sleep duration, particularly when screens are viewed shortly before bedtime, and each hour of screen time reduces sleep duration by three minutes (Chang and Lei, 2021).

The limitations of this research include challenges in adjusting the distribution of respondents during the sample recruitment process, which resulted in the predominance of mothers with higher educational levels. Additionally, there was a limitation associated with the use of the backward elimination procedure, as the authors were unable to report all variables that were excluded during the regression process.

# Conclusion

Parental support for children's movement behavior is influenced by the characteristics of both mothers and children. Daily light activities performed by children influence maternal support for these activities as well as the adequacy and consistency of the children's sleep patterns. Additionally, children who possess personal gadgets impact parental support for moderate-tovigorous activities, sedentary behavior, and sleep adequacy and regularity. Another finding of this study indicates that the duration of the mother's sleep affects her support for the child's sedentary activities. Furthermore, both the mother's and child's exercise habits, when practiced more than three days a week, significantly influenced the mother's support for the child's moderate-to-vigorous activities.

Excessive or insufficient physical activity disrupts the balance between the proportion of sleep and children's

daily activities. The implementation of nursing practices related to parental support in the physical activities of children should focus on optimizing parental knowledge, good habits, and their roles as role models. Additionally, more research is needed to expand our understanding of movement behaviors in children and parents in the Asian context.

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# **Conflict of Interest**

The authors declare that we do not have any conflict of interest.

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#### Rachmawati, Krisnana, Pradanie, Qur'aniati, Arief, Biru, Asih, Rithpho, and Kurnia (2024)

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